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Technical features of Penn State's Instructional Media Center are described. Unlike many other instructional units, special attention has been paid to the physiological requirements for learning in its design and construction, i.e., acoustics, lighting, visibility, and air conditioning. The building contains many unique features which may be integrated in various ways to promote better and more efficient methods of instruction and maximize the use of new techniques and resources suitable in its utilization. Contents include--(1) audio-visual equipment, (2) auditorium lighting, (3) the central core plan, (4) electronic podium, (5) acoustics, (6) additional media, and (7) television. Future provisions for installation of individual student response stations are planned. (RH)

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Recent Developments and the Impact of the Newer Media

by

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THE FORUM

Penn State's Instructional Media Center

Introduction

The Forum Building is one of three buildings in the new arts complex. Unlike many other instructional units, special attention has been paid to the physiological requirements for learning in its design and construction, i.e., acoustics, lighting, visibility, air conditioning, etc. The building contains many unique features which may be integrated in various ways to promote better and more efficient methods of instruction and to maximize the use of the "newer" technological techniques and resources particularly suitable in its utilization.

It contains motion picture projectors, slide projectors--both 2" x 2" and 3-1/2" x 4", audio mixer, amplifying units, ultraviolet and fluorescent light, audio recorders and television equipment. This equipment makes it possible for the same or different types of instruction to occur simultaneously throughout the four instructional auditoriums. Videotape machines which may present recorded lectures and demonstrations are located in the television master control room located in the nearby Chambers Building. From the master control room live instructional presentations from the University's four main production studios, from video tape machines or from off-the-air pickup can be transmitted to any combination of instructional auditoriums in the Forum.

Physically, the structure is circular in shape and contains a central core (diameter 28-1/2') which consists of three levels. Level one of the core is known as the preparation area. Here instructors are able to store materials and to prepare demonstrations, equipment, experiments, etc., for presentation in their daily lectures. Level two of the core is where the television projectors are located. Level three is known as the "cat walk"--a 5' wide platform "ringing" the central core of the building. This is where the projection equipment, mounted in clusters, is located.

The Forum embraces four pie-shaped (wedge) instructional auditoriums each containing 396 seats. Each room contains approximately 3,014 square feet of instructional space, a 7' x 14' rear projection screen,[1] an 8' front projection screen, an electronic podium, and a demonstration table with access to water and electricity. Bottled gas may be installed, if needed.

These unique characteristics and the novel ways in which they may be combined tend to make this structure a suitable place for varied types of learning to occur.

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[1] A rear projection screen is one which has the projectors and the viewers on opposite sides of a translucent screen upon which the image is displayed or projected. When employing a rear projection screen, all the projection equipment is situated behind the screen, and is hidden from the viewing audience.

Auditoria Lighting

Lighting is of special importance in instructional areas for the optimum use of the various media. For example, it has been found that the various media need various lighting levels; that is, they are viewed most efficiently when several levels of room lighting are made available which are consistent with, the keyed to, the medium being used. For this reason predetermined light levels have been established for the various media in the Forum's four instructional auditoriums for the instructor's usage--in the interest of economy of time and viewing effectiveness. Even though the light levels are set, they are controlled by the instructor; his control extends to the selection and to the duration of use of a particular light level. Lighting sequences are very flexible; however, any instructor who wishes to experiment with the light levels, for achievement of special effects in his classroom lectures, need only to contact the technician and every effort is made to comply with his wishes.

In the Forum lighting from full light to darkness can be instructor controlled. Imaginative and adventurous instructors can alter and vary the light levels to create the particular levels they desire. They have the use of twelve individual spotlights, banks of overhead down-lamps, overhead fixed-surface lighting lamps, aisle down-light, and so on. Auditoria lighting has been designed so that as little light as possible reaches the projection screen itself; however, care has been taken to make sure that the student's note-taking

tablet has been adequately lighted so as to permit note-taking and to eliminate the formation of shadows. The lamp banks emit their light in such a way that the students are not consciously aware of the light sources within their normal line of vision to the projection screen.

One advantage of using the rear screen projection is that it reduces the amount of ambient light striking the viewing screen; consequently, a much higher level of room lighting can be tolerated in the viewing area for student note-taking. For example, the rear screen may reflect as little as 5% of the ambient light striking it, thus greatly increasing the clarity of the visual image.

The Central Core

The nerve center of the Forum Building's operations lies within the central core of the building. All of the projection equipment is positioned in four clusters around the circular catwalk (level three). The projectors are arranged along the catwalk so that the images will cross the core and reflect on the reverse side of the rear projection screen for viewing from the front. Each projection cluster contains a 16mm sound projector, two 2" x 2" slide projectors with mechanical or automatic time slide changes, and a 3-1/2" x 4" slide projector which holds 80 slides. Slide projectors are equipped with vari-focal lenses with control being possible via the local operational position or from a remote position in each auditorium. To conserve space behind the screen, the motion picture projectors feed into a front surface 3" x 4" mirror which reflects the image on the rear projection screen in proper

perspective classroom viewing.

Blackout drapes have been provided to cover the projection side of the rear projection screens when not in use to prevent transient light or reflections from striking the other viewing areas--thereby reducing the contrast level.

The television projectors are mounted on the floor in the middle of the central core (level two) aimed at their respective rear projection screens. The rear view screens are extremely versatile and can be used for projection slides, and for movie and television presentations.

Electronic Podium

The electronic podiums used in the four auditoriums were designed by the University's electronic planning engineer. A control podium is positioned in each instructional auditorium and provides the instructor with unlimited potential for utilizing and integrating visual and audio material into the teaching-learning situation.

Even though the control panel on the podium contains a bank of push buttons and a mass of wiring, simplicity of design and operation had been the watchword during planning, as it was realized that the users of the auditoria would have little previous experience with the various media.

The instructor from his position on or near the podium is allowed to personally operate most of the multi-media. He can start, stop, focus, and reverse two 2" x 2" slide projectors; he can also control the forward motion and the focus of the 3-1/2" x 4" slide projector.

He also can start, stop, reverse, and raise and lower the sound on the 16mm motion picture projector. Electronic pointers are available so that the instructor may point to the various parts (structures) of the visual illustrations as he discusses them in his presentation. This particular aspect has a tendency to focus the student's attention on the specific visual characteristics in the lecture that the instructor deems important. The almost complete automation with which the instructor can call upon the various media enables him to present his content material at a pace which he feels his students can handle the material--he can call up any combination of visuals he desires when he desires. Instantaneous switch-over from one 2" x 2" slide projector to the other, to the 3-1/2" projector, to the motion picture film, to the overhead projector, to television, etc., allows the instructor much flexibility in presenting his instructional content. Also, 2" x 2" slides may be made from 16mm motion picture films for presentation with the original film to provide extended time for viewing, study, and examinations.

Each classroom control podium contains a remote control panel located in the central core where the technician can monitor the sound system and adjust the various projection equipment if needed.

If anything happens to go wrong with the projection equipment, the instructor simply calls the technician via his direct sound-powered telephone which is located on his podium. All projectors may be operated manually by the technician regardless of which projector is active. This permits the technician to change or reload slides without switching

to local control on the podium. The technician also has the responsibility for maintaining constant communication with the television master control so as to guarantee the synchronization of the television presentation with the instructor's intent. He is also responsible for audio taping instructor lectures and instructor-student interactions if so requested by the instructor.

Acoustics

Special attention has been given to the problem of hearing in each auditorium to make sure that good conditions exist in all places where the learning process requires listening. The acoustics have been so designed that in the normal use of the voice, amplification is not necessary. The walls and ceilings of the Forum have been constructed so that, regardless of where the student is seated, he can hear as if he were in the front row. Amplification systems are available, however, if so desired by the lecturer.

The amplification of sound is provided via a central high-level speaking system containing a single speaker located directly above the instructional area. It is directed at the center of the audience. The built-in sound system is designed for the amplification and distribution of sound; it is capable of accommodating interchangeably all needs--sound tracks of films, audio and video tape, radio, television, audio intercom announcements, and, when desired, sounds picked up by room microphones.

Additional Media

In large instructional auditoriums, like those contained within the Forum, supplementary local lighting is necessary and should be available to provide additional illumination on instructional areas, i.e., chalkboard, demonstration areas, and on the instructor as he lectures.

The problem of additional local lighting for chalkboard instruction has been resolved to a great extent in the auditoria. When the light level in an auditorium has been reduced to facilitate viewing of the various types of visual illustrations, the instructor has access to black light (ultraviolet light) which enables him to write any comments, directions, or key words on the chalkboard during periods of semi-darkness. By using fluorescent chalk, he doesn't have to increase the light level of the room in order to use the chalkboard for instructional purposes. The ultraviolet light striking the fluorescent chalk can readily be seen by students in the semi-lighted auditorium regardless of where they may be sitting. Additional chalkboards counterbalanced for vertical positioning are available for instructors who teach content which lends itself to extensive use of the chalkboard.

Below the rear-projection screen in each room is an 8' front projection screen which can be rolled down for use with an over-head projector in each of the auditoriums. These projectors may be operated by the instructor during semi-automated presentations. Additional overhead projectors are also available for use by the instructor from the lower core room (level one) if he wants to project several visual illustrations simultaneously to make comparisons among them, or to conduct

lengthy discussions about various characteristics inherent within the several illustrations. The projectors are mounted on rolling stands for easy use and maneuverability. For purposes of comparison and discussion, some instructors have found it worthwhile to use as many as three over-head projectors simultaneously to project reference material for the students, while also using two 2" x 2" slide projectors to project their contents on the large rear projection screen side by side.

Television

The central core (level two) contains four rocket-shaped television projectors mounted on the floor and directed at their respective translucent rear-projection screens. These projectors, by means of the television's master control center, can present live studio teaching from the University's four production studios, video tape recordings of lectures, demonstrations, experiments, etc., or on-the-air telecasts which may be of particular help to a specific class at a particular time. The television projectors can also be used to receive complete programs (course lessons) originating in other parts of the campus and transmit the programs to students receiving their instruction in the Forum. In this manner, students view the presentation on the large 7' x 14' rear view projection screen rather than on 23" monitors.

Industrial type vidicon cameras can be placed in any of the four instructional auditoriums, therefore allowing the instructor to use the camera as an overhead projector to magnify demonstrations or scientific specimens with the resulting video being projected on the large rear view projection screen of a single auditorium or on any desired number of rear projection screens.

Future Plans

Provisions have been designed in the Forum for the future installation of individual student response stations to be located at each seat. Students would be able to use the response system for examinations and quizzes. The students' responses would be transmitted to an electronic storage system where the University's computers would grade and record them immediately. The computers will have the capacity to receive large numbers of responses simultaneously and to respond immediately. They will be able to store all information, process and score selected data, and then print out summaries of the total class results and also the results of the individual respondent. This type of statistical information would be of much value both to the instructor and to the student. For the instructor statistical results of students' responses might help him to be able to judge immediately how well he is communicating with the students. He would readily be aware of what concepts with which many of the students are having difficulty and be able to take the proper remedial or reteaching actions almost immediately. In many cases student responses may be evaluated while the lesson is still in progress. In this case the instructor would always be sure that the students had an adequate awareness of the current content material being discussed before he moved on to new material. Students would also be able to benefit from such a system. They would be able to find out almost immediately where their particular weaknesses are located and be able to take appropriate actions to rectify

the situation. This type of reinforcement would possibly have a tendency to stabilize the desired behavioral patterns and to enable students to clarify and correct initial problems and ways of perceiving and thinking that they will be able to progress steadily through the content material with a minimum of difficulty. In other words, the installation of the student response mechanisms coupled with the computer hook-up will make it possible for students to interact continuously with the instructional material presented and to be able to have their responses reinforced or corrected almost immediately.

The computer system and the several instructional media systems will make it possible for the University to teach and test in ways and at levels of efficiency which have not, until the present time, been possible. It is also worthwhile to note that many of these systems may be operational simultaneously in each or all of the auditoriums where the same instruction is being presented or where as many as four different courses are being presented concurrently.